

Doppler echocardiography including the measurement of the LA volume at end-systole by the biplane area-length method (from the 4- and 2-apical chamber views), indexed to body surface area (ml/m^2), LVEF by the biplane Simpson's method, LV mass by the ASE M-mode method, and early (e'), late diastolic (a'), and systolic (Sa) mitral annular Doppler tissue velocities were calculated as an average of the septal and lateral values.

Results The mean LA volume was $33 \pm 12 \text{ mL}/\text{m}^2$ (extreme values: 13 and $72 \text{ mL}/\text{m}^2$), and dilated LA (defined as $\text{LA} \geq 34 \text{ mL}/\text{m}^2$) was found in 34 cases (43%). In univariate analysis, indexed LA volume was significantly linked to age, hypertension (all, $p < 0.05$), LV mass/ m^2 ($r = 0.5$), pulmonary artery systolic pressure (PASP) ($r = 0.55$), mitral E/A ratio ($r = 0.32$), E/e' ratio ($r = 0.46$), a' ($r = -0.4$), LVEF ($r = -0.3$) (all, $p < 0.01$), and Sa ($r = -0.27$, $p < 0.05$). In multivariate analysis, indexed LA volume was independently associated with LV mass/ m^2 , E/e' , and PASP (all, $p < 0.01$). Furthermore indexed LA volume was significantly higher in symptomatic patients ($n = 46$) when compared to asymptomatic patients (36 ± 13 vs. $28 \pm 10 \text{ mL}/\text{m}^2$, $p < 0.01$), with an independent link in a separate multivariate analysis ($p < 0.01$), and was independently correlated to NT-proBNP (Log) in a subgroup of 53 patients who had plasmatic values of this biomarker available ($r = 0.6$, $p < 0.01$).

Conclusion In severe AS with preserved LVEF, LA size is higher in symptomatic patients, and is independently linked to LV remodeling, LV diastolic dysfunction, and PASP, as well as to NT-proBNP a surrogate of increased LV wall stress.

The author hereby declares no conflict of interest

0472

Echocardiographic prediction of early systolic postoperative left ventricular failure after surgery of severe mitral regurgitation

François Bagate* (1), Caroline Kerneis (2), Olivier Belliard (2), Jean-Claude Dib (2), Sandra Janower (2), Philippe Estagnasie (2), Pierre Squara (2)

(1) APHP-Hôpital Cochin, Paris, France – (2) Clinique Ambroise Paré, Neuilly Sur Seine, France

*Corresponding author: francois2801@hotmail.com (François Bagate)

Introduction Early postoperative left ventricle failure (LVF) is frequent in patients with chronic severe mitral regurgitation (MR) after both valve repair and replacement. The aim of this study was to assess whether a preoperative two-dimensional echocardiography analysis may predict the LVF.

Methods Patients exclusively operated for MR were included prospectively in this study. Rest echocardiography was performed before surgery (D0), and at day 1, and day 7, including speckle tracking to assess the global longitudinal left ventricular strain (LVS). Exclusion criteria were combined surgery and uncontrolled arrhythmia. LVF was defined as $\text{LVEF} < 45\%$. A logistic regression and a multivariate linear regression were performed when appropriate, including variables with $p < 0.10$ in a univariate analysis (ANOVA).

Results Between February 2012 and November 2014, 93 consecutive patients (age=65 years [55-74]; 56 men) underwent repair or replacement of the mitral valve for MR (median regurgitant orifice area= 52.7 mm^2 , regurgitant volume= 77.5 mL). LVEF decrease from $65 \pm 7\%$ at D0 to 53 ± 11 ($p < 0.01$) at D1 and 56 ± 10 ($p < 0.01$) at D7. LVF was shown in 31 patients (33%). Average postoperative change of LVEF was $-14.4 \pm 9.8\%$.

Postoperative decrease in $\text{LVEF} > 20\%$ was found in 24 patients (26%). Seven preoperative echocardiographic variables were associated with LVF in univariate analysis: LVEF, LVS, transmitral E-wave (E), transmitral A-wave (A), E/A, velocity of the tricuspid annular systolic motion and BMI. In multivariate analyses, only high LVS and low BMI were independent predictors of LVF: OR=0.65 [0.43-0.85], $p = 0.02$, and OR=1.66 [1.24-2.5], $p = 0.002$, respectively. Two variables were significantly related to the variation of postoperative LVEF in the multivariate model: weight ($p = 0.05$) and LVEF ($p = 0.04$).

Conclusion After surgical correction of MR, LVF is frequent and predicted by LVS and BMI, whereas LVEF and weight can predict LVEF variation.

The author hereby declares no conflict of interest

0157

Echo-based diastolic intraventricular pressure difference as a surrogate of left ventricular untwisting

Amir Hodzic* (1), Damien Garcia (2), Leonardo Krsticevic (2), Boris Chayer (2), Guy Cloutier (2), Francois Tournoux (2)

(1) University of Montreal, Hospital Centre, Montreal, Canada – (2) University of Montreal, Montreal, Quebec, Canada

*Corresponding author: amco14@yahoo.fr (Amir Hodzic)

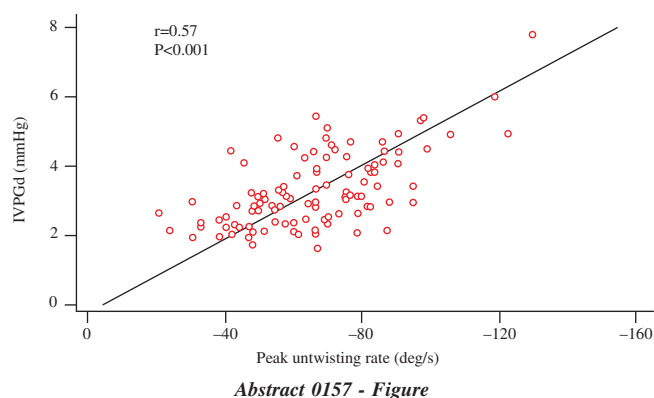
Background Left ventricular (LV) early diastolic filling is related to an active process of LV relaxation, caused by its rapid untwisting. The untwisting rate (UR) has been reported to be a robust marker of diastolic function but is technically hard to assess in practice. The untwisting phenomenon generates a diastolic intraventricular pressure gradient (IVPGd), which can be assessed by colour Doppler M-Mode. Previous studies showed a close temporal relation between the UR and the IVPGd peaks, but the relation between their magnitudes as well as their load dependency remain unclear.

Method We developed our own Matlab software for IVPGd assessment by colour Doppler M-Mode based on Bernoulli equation.

From our research database, we retrieved all echocardiograms where ejection fraction was normal, the colour M-Mode tracing was available and UR was measurable using speckle tracking. Passive leg raising was used in 19 healthy volunteers to study the impact of preload on the IVPGd measurement.

Results We included 104 echocardiograms (83% males, median age 23y [19-69]). The median peak IVPGd was 3.1 mmHg [1.6-7.8] and correlated to the peak UR ($r = 0.57$, $P < 0.0001$, figure). There was also a significant correlation between the IVPGd peak and E' ($r = 0.62$, $P < 0.0001$). For peak IVPGd, correlations between inter- and intra-observer measures were calculated on 10 randomly selected subjects and were 0.83 and 0.99 ($P < 0.05$). Compared to UR and E' , IVPGd was also significantly increased with leg lifting ($2.7 \pm 0.8 \text{ mmHg}$ vs $3.3 \pm 0.8 \text{ mmHg}$, $P < 0.001$).

Conclusion Peak IVPGd based on colour Doppler M mode echocardiography is positively correlated to the LV UR. Despite the observation that IVPGd is not less load-dependent than other parameters, it requires only an echo loop easily obtained during routine clinical studies and is highly reproducible using a semi-automatic software algorithm. This new tool could easily become a new practical echo index for diastolic function assessment.



The author hereby declares no conflict of interest